

PAGE: 1

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/026,400

DATE: 08/06/1999
TIME: 13:30:23

Input Set: I026400.RAW

This Raw Listing contains the General Information
Section and up to first 5 pages.

ENTERED

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1  <110> APPLICANT: MORI, Satoshi
2      NAKANISHI, Hiromi
3      TAKAHASHI, Michiko
4  <120> TITLE OF INVENTION: Nicotianamine Aminotransferase and Gene Therefor
5  <130> FILE REFERENCE: 2185-0226P
6  <140> CURRENT APPLICATION NUMBER: US/09/026,400
7  <141> CURRENT FILING DATE: 1998-02-19
8  <150> EARLIER APPLICATION NUMBER: 09-037499 JAPAN
9  <151> EARLIER FILING DATE: 1997-02-21
10 <160> NUMBER OF SEQ ID NOS: 7
11 <170> SOFTWARE: PatentIn Ver. 2.0
12 <210> SEQ ID NO 1
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14 <212> TYPE: DNA
15 <213> ORGANISM: Hordeum vulgare
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22      Met Val His Gln Ser Asn Gly His Gly Glu Ala Ala Ala Ala Ala Ala
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24      aac ggc aag agc aac ggg cac gcc gcc gcc gcg aac ggc aag agc aac 157
25      Asn Gly Lys Ser Asn Gly His Ala Ala Ala Ala Asn Gly Lys Ser Asn
26          20          25          30
27      ggg cac gcg gcg gcg gcg gcg gtg gag tgg aat ttc gcc cgg ggc aag 205
28      Gly His Ala Ala Ala Ala Ala Val Glu Trp Asn Phe Ala Arg Gly Lys
29          35          40          45
30      gac ggc atc ctg gcg acg acg ggg gcg aag aac agc atc cgg gcg ata 253
31      Asp Gly Ile Leu Ala Thr Thr Gly Ala Lys Asn Ser Ile Arg Ala Ile
32          50          55          60
33      cgg tac aag atc agc gcg agc gtg gag gag agc ggg ccg cgg ccc gtg 301
34      Arg Tyr Lys Ile Ser Ala Ser Val Glu Glu Ser Gly Pro Arg Pro Val
35          65          70          75          80
36      ctg ccg ctg gcc cac ggt gac ccg tcc gtg ttc ccg gcc ttc cgc acg 349
37      Leu Pro Leu Ala His Gly Asp Pro Ser Val Phe Pro Ala Phe Arg Thr
38          85          90          95
39      gcc gtc gag gcc gaa gac gcc gtc gcc gcc gcg ctg cgc acc ggc cag 397
40      Ala Val Glu Ala Glu Asp Ala Val Ala Ala Ala Leu Arg Thr Gly Gln
41          100          105          110
42      ttc aac tgc tac gcc gcc ggc gtc ggc ctc ccc gcc gca cga agc gcc 445
43      Phe Asn Cys Tyr Ala Ala Gly Val Gly Leu Pro Ala Ala Arg Ser Ala
44          115          120          125

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PAGE: 2

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/026,400

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 TIME: 13:30:23

Input Set: I026400.RAW

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46	Val Ala Glu His Leu Ser Gln Gly Val Pro Tyr Lys Leu Ser Ala Asp	
47	130 135 140	
48	gac gtc ttc ctc acc gcc ggc gga act cag gcg atc gaa gtc ata atc	541
49	Asp Val Phe Leu Thr Ala Gly Gly Thr Gln Ala Ile Glu Val Ile Ile	
50	145 150 155 160	
51	ccg gtg ctg gcc cag act gcc ggc gcc aac ata ctg ctt ccc cgg cca	589
52	Pro Val Leu Ala Gln Thr Ala Gly Ala Asn Ile Leu Leu Pro Arg Pro	
53	165 170 175	
54	ggc tat cca aat tac gag gcg cga gcg gca ttc aac aag ctg gag gtc	637
55	Gly Tyr Pro Asn Tyr Glu Ala Arg Ala Ala Phe Asn Lys Leu Glu Val	
56	180 185 190	
57	cgg cac ttc gac ctc atc ccc gac aag ggg tgg gag atc gac atc gac	685
58	Arg His Phe Asp Leu Ile Pro Asp Lys Gly Trp Glu Ile Asp Ile Asp	
59	195 200 205	
60	tcg ctg gaa tcc atc gcc gac aag aac acc acc gcg atg gtc atc ata	733
61	Ser Leu Glu Ser Ile Ala Asp Lys Asn Thr Thr Ala Met Val Ile Ile	
62	210 215 220	
63	aac cca aac aat ccg tgc ggc agc gtt tac tcc tac gac cat ctg gcc	781
64	Asn Pro Asn Asn Pro Cys Gly Ser Val Tyr Ser Tyr Asp His Leu Ala	
65	225 230 235 240	
66	aag gtc gcg gag gtg gca agg aag ctc gga ata ttg gtg atc gct gac	829
67	Lys Val Ala Glu Val Ala Arg Lys Leu Gly Ile Leu Val Ile Ala Asp	
68	245 250 255	
69	gag gtt tac ggc aaa ctg gtt ctg ggc agc gcc ccg ttt atc ccg atg	877
70	Glu Val Tyr Gly Lys Leu Val Leu Gly Ser Ala Pro Phe Ile Pro Met	
71	260 265 270	
72	ggc gtc ttt ggg cac att gcc ccg gtc ttg tcc att gga tct ctg tcc	925
73	Gly Val Phe Gly His Ile Ala Pro Val Leu Ser Ile Gly Ser Leu Ser	
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75	aag tcg tgg ata gtg cct gga tgg cga ctt gga tgg gtg gcg gtg tac	973
76	Lys Ser Trp Ile Val Pro Gly Trp Arg Leu Gly Trp Val Ala Val Tyr	
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81	aat tac ctt aat gtc tca acg gac cca gca acc ttc gtt cag gaa gct	1069
82	Asn Tyr Leu Asn Val Ser Thr Asp Pro Ala Thr Phe Val Gln Glu Ala	
83	325 330 335	
84	ctt cct aaa att ctt gag aac aca aaa gca gat ttc ttt aag agg att	1117
85	Leu Pro Lys Ile Leu Glu Asn Thr Lys Ala Asp Phe Phe Lys Arg Ile	
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87	att ggt cta cta aag gaa tca tca gag ata tgt tat agg gaa ata aag	1165
88	Ile Gly Leu Leu Lys Glu Ser Ser Glu Ile Cys Tyr Arg Glu Ile Lys	
89	355 360 365	
90	gaa aac aaa tat att acg tgt cct cac aag cca gaa gga tcg atg ttt	1213
91	Glu Asn Lys Tyr Ile Thr Cys Pro His Lys Pro Glu Gly Ser Met Phe	
92	370 375 380	
93	gta atg gtc aaa cta aac tta cat ctt ttg gag gag atc cat gac gac	1261
94	Val Met Val Lys Leu Asn Leu His Leu Leu Glu Glu Ile His Asp Asp	

PAGE: 3

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/026,400

DATE: 08/06/1999
TIME: 13:30:23

Input Set: I026400.RAW

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98      405      410      415
99      cca ggg agt gtt ctt gga atg gaa aat tgg gtc cgt att act ttt gcc 1357
100     Pro Gly Ser Val Leu Gly Met Glu Asn Trp Val Arg Ile Thr Phe Ala
101     420      425      430
102     tgc gtt cca tct tct ctt caa gat gga ctc gaa agg gtc aaa tca ttc 1405
103     Cys Val Pro Ser Ser Leu Gln Asp Gly Leu Glu Arg Val Lys Ser Phe
104     435      440      445
105     tgt caa agg aac aag aag aag aat tct ata aat ggt tgt tagttgtaca 1454
106     Cys Gln Arg Asn Lys Lys Lys Asn Ser Ile Asn Gly Cys
107     450      455      460
108     caccctagtg tgtacatctg actgaagctg taaatcattt ctagttatcc cccatttata 1514
109     tattttcaata aaacatattg taatggttct gttgtagctg tccaagtcac gtactctact 1574
110     ttttgatgta tttggcctca ttgccttgca tcaatttcaa taaaaatggg tgtgtacacc 1634
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120     20      25      30
121     Gly His Ala Ala Ala Ala Ala Val Glu Trp Asn Phe Ala Arg Gly Lys
122     35      40      45
123     Asp Gly Ile Leu Ala Thr Thr Gly Ala Lys Asn Ser Ile Arg Ala Ile
124     50      55      60
125     Arg Tyr Lys Ile Ser Ala Ser Val Glu Glu Ser Gly Pro Arg Pro Val
126     65      70      75      80
127     Leu Pro Leu Ala His Gly Asp Pro Ser Val Phe Pro Ala Phe Arg Thr
128     85      90      95
129     Ala Val Glu Ala Glu Asp Ala Val Ala Ala Ala Leu Arg Thr Gly Gln
130     100      105      110
131     Phe Asn Cys Tyr Ala Ala Gly Val Gly Leu Pro Ala Ala Arg Ser Ala
132     115      120      125
133     Val Ala Glu His Leu Ser Gln Gly Val Pro Tyr Lys Leu Ser Ala Asp
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135     Asp Val Phe Leu Thr Ala Gly Gly Thr Gln Ala Ile Glu Val Ile Ile
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137     Pro Val Leu Ala Gln Thr Ala Gly Ala Asn Ile Leu Leu Pro Arg Pro
138     165      170      175
139     Gly Tyr Pro Asn Tyr Glu Ala Arg Ala Ala Phe Asn Lys Leu Glu Val
140     180      185      190
141     Arg His Phe Asp Leu Ile Pro Asp Lys Gly Trp Glu Ile Asp Ile Asp
142     195      200      205
143     Ser Leu Glu Ser Ile Ala Asp Lys Asn Thr Thr Ala Met Val Ile Ile
144     210      215      220

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PAGE: 4

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/026,400

DATE: 08/06/1999
TIME: 13:30:23

Input Set: I026400.RAW

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147      Lys Val Ala Glu Val Ala Arg Lys Leu Gly Ile Leu Val Ile Ala Asp
148                245                250                255
149      Glu Val Tyr Gly Lys Leu Val Leu Gly Ser Ala Pro Phe Ile Pro Met
150                260                265                270
151      Gly Val Phe Gly His Ile Ala Pro Val Leu Ser Ile Gly Ser Leu Ser
152                275                280                285
153      Lys Ser Trp Ile Val Pro Gly Trp Arg Leu Gly Trp Val Ala Val Tyr
154                290                295                300
155      Asp Pro Thr Lys Ile Leu Glu Lys Thr Lys Ile Ser Thr Ser Ile Thr
156      305                310                315                320
157      Asn Tyr Leu Asn Val Ser Thr Asp Pro Ala Thr Phe Val Gln Glu Ala
158                325                330                335
159      Leu Pro Lys Ile Leu Glu Asn Thr Lys Ala Asp Phe Phe Lys Arg Ile
160                340                345                350
161      Ile Gly Leu Leu Lys Glu Ser Ser Glu Ile Cys Tyr Arg Glu Ile Lys
162                355                360                365
163      Glu Asn Lys Tyr Ile Thr Cys Pro His Lys Pro Glu Gly Ser Met Phe
164                370                375                380
165      Val Met Val Lys Leu Asn Leu His Leu Leu Glu Glu Ile His Asp Asp
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167      Ile Asp Phe Cys Cys Lys Leu Ala Lys Glu Glu Ser Val Ile Leu Cys
168                405                410                415
169      Pro Gly Ser Val Leu Gly Met Glu Asn Trp Val Arg Ile Thr Phe Ala
170                420                425                430
171      Cys Val Pro Ser Ser Leu Gln Asp Gly Leu Glu Arg Val Lys Ser Phe
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186      1 5 10
187      aac ggc ctt gcc gtg gcc gca gcc gcg aac ggc aag agc aac ggc cat 159
188      Asn Gly Leu Ala Val Ala Ala Ala Asn Gly Lys Ser Asn Gly His
189      15 20 25
190      ggc gtg gct gcc gcc gtg aac ggc aag agc aac ggc cat ggc gtg gat 207
191      Gly Val Ala Ala Ala Val Asn Gly Lys Ser Asn Gly His Gly Val Asp
192      30 35 40
193      gcc gac gcg aac ggc aag agc aac ggc cat ggc gtg gct gcc gac gcg 255
194      Ala Asp Ala Asn Gly Lys Ser Asn Gly His Gly Val Ala Ala Asp Ala

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PAGE: 5

RAW SEQUENCE LISTING
PATENT APPLICATION US/09/026,400

 DATE: 08/06/1999
 TIME: 13:30:23

Input Set: I026400.RAW

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197	Asn Gly Lys Ser Asn Gly His Ala Glu Ala Thr Ala Asn Gly His Gly				
198	65	70	75		
199	gag gcc act gcg aac ggc aag acc aac ggc cac cgc gag agc aac ggc	351			
200	Glu Ala Thr Ala Asn Gly Lys Thr Asn Gly His Arg Glu Ser Asn Gly				
201	80	85	90		
202	cat gct gag gcc gcc gac gcg aac ggc gag agc aac gag cat gcc gag	399			
203	His Ala Glu Ala Ala Asp Ala Asn Gly Glu Ser Asn Glu His Ala Glu				
204	95	100	105		
205	gac tcc gcg gcg aac ggc gag agc aac ggc cat gcg gcg gcg gca	447			
206	Asp Ser Ala Ala Asn Gly Glu Ser Asn Gly His Ala Ala Ala Ala				
207	110	115	120		
208	gag gag gag gag gcg gtg gag tgg aat ttc gcg ggt gcc aag gac ggc	495			
209	Glu Glu Glu Glu Ala Val Glu Trp Asn Phe Ala Gly Ala Lys Asp Gly				
210	125	130	135	140	
211	gtg ctg gcg gcg acg ggc gcg aac atg agc atc cgg gcg ata cgg tac	543			
212	Val Leu Ala Ala Thr Gly Ala Asn Met Ser Ile Arg Ala Ile Arg Tyr				
213	145	150	155		
214	aag atc agc gcg agc gtg cag gag aag ggc ccg cgg ccc gtg ctg ccg	591			
215	Lys Ile Ser Ala Ser Val Gln Glu Lys Gly Pro Arg Pro Val Leu Pro				
216	160	165	170		
217	ctg gcc cac ggc gac ccg tcc gtg ttc ccg gcc ttc cgc acg gcc gtc	639			
218	Leu Ala His Gly Asp Pro Ser Val Phe Pro Ala Phe Arg Thr Ala Val				
219	175	180	185		
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221	Glu Ala Glu Asp Ala Val Ala Ala Ala Val Arg Thr Gly Gln Phe Asn				
222	190	195	200		
223	tgc tac ccc gcc ggc gtc ggc ctc ccc gcc gca cga agc gcc gtg gca	735			
224	Cys Tyr Pro Ala Gly Val Gly Leu Pro Ala Ala Arg Ser Ala Val Ala				
225	205	210	215	220	
226	gag cac ctg tcg cag ggc gtg ccg tac atg cta tcg gcc gac gac gtc	783			
227	Glu His Leu Ser Gln Gly Val Pro Tyr Met Leu Ser Ala Asp Asp Val				
228	225	230	235		
229	ttc ctc acc gcc ggc ggc acc cag gcg atc gag gtc ata atc ccg gtg	831			
230	Phe Leu Thr Ala Gly Gly Thr Gln Ala Ile Glu Val Ile Ile Pro Val				
231	240	245	250		
232	ctg gcc cag acc gcc ggc gcc aac att ctg ctc ccc agg cca ggc tac	879			
233	Leu Ala Gln Thr Ala Gly Ala Asn Ile Leu Leu Pro Arg Pro Gly Tyr				
234	255	260	265		
235	cca aac tac gag gcg cgc gcc gcg ttc aac agg ctg gag gtc cgg cat	927			
236	Pro Asn Tyr Glu Ala Arg Ala Ala Phe Asn Arg Leu Glu Val Arg His				
237	270	275	280		
238	ttc gac ctc atc ccc gac aag ggc tgg gag atc gac atc gac tcg ctg	975			
239	Phe Asp Leu Ile Pro Asp Lys Gly Trp Glu Ile Asp Ile Asp Ser Leu				
240	285	290	295	300	
241	gaa tcc atc gcc gac aag aac acc acc gcc atg gtc atc ata aac ccc	1023			
242	Glu Ser Ile Ala Asp Lys Asn Thr Thr Ala Met Val Ile Ile Asn Pro				
243	305	310	315		
244	aac aac ccg tgc ggc agc gtt tac tcc tac gac cat ctg tcc aag gtc	1071			

Please Note:

Use of n and/or Xaa have been detected in the Sequence Listing. Please review the Sequence Listing to ensure that a corresponding explanation is presented in the <220> to <223> fields of each sequence which presents at least one n or Xaa.

Input Set: I026400.RAW

Line ? Error/Warning

Original Text

378 W "N" or "Xaa" used: Feature required

gcngtngart ggaayttygc nmg

390 W "N" or "Xaa" used: Feature required

gcdatrtgnc craanacncc